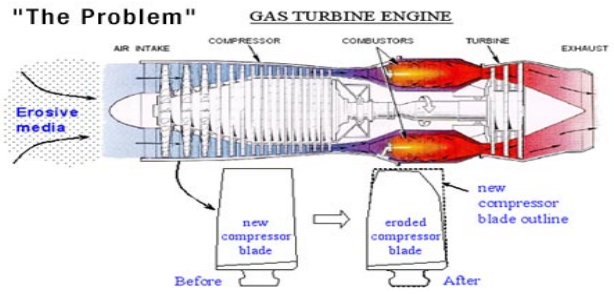
SUCCESS STORY

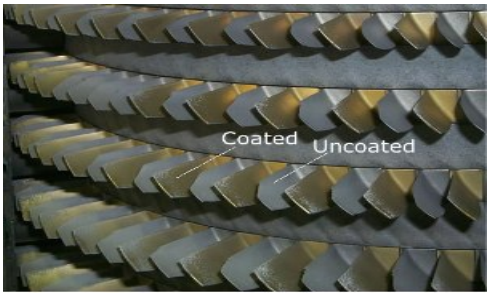
FCT's Russian-Developed Coating for Engine Blades Keeps Helicopters Flying Longer

A Russian-developed engine blade coating, assessed by AS&Cs Foreign Comparative Testing, helps Marine helicopters fly longer in desert areas before requiring heavy-duty maintenance.

In Operation Desert Storm, sand eroded blades in helicopter turbine engines, particularly in the Marines CH-53 helicopters. Consequently, this reduced engine power and heavy lifting. It also shortened engine operating times to 1/20 of design life, costing about $600,000 in repairs.

Russia had that problem in Afghanistan in the 1980s. However, its Ural Works of Civil Aviation ("PRAD" in Russian) developed a thin erosion resistant coating of titanium nitride (TiN) for engine blades, protecting Mi-24 and Mi-48 helicopters. The technology was discovered by Canada's MDS Aerospace Corporation, and made known to U.S. Naval Air Systems Command. The coatings testing, funded by AS&C's Foreign Comparative Testing program, found that coated blades lasted five times longer than uncoated blades in sandy environments.





Engine particle separators are 90% effective at removing sand particles, but some sand can still reach and erode blades as left graphic depicts. Right photo shows coated and uncoated blades after sand exposures.

A joint Canadian-Russian venture called MDS-PRAD was set-up in Canada to satisfy U.S., Canadian and Russian requirements. Here, coating is applied to U.S.-made turbine engine blades. Marines now have engines in CH-53 and CH-46 helicopters operating in desert environments with over 1,000 hours on them, almost 10-times greater than Desert Storm. It's roughly estimated that the coating saves up to $8 million per CH-53E annually. Also, these helicopters have totaled 250,000 flight hours in theatre, with no engines pulled for low power due to eroded compressors. In addition, the coating is being evaluated for Navy aircraft engines. As an MDS-PRAD representative recently said, "The FCT program has done great good."

For more information on the FCT program, visit http://www.acq.osd.mil/cto/ .